



Annual Combined Stability Report 2021

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1. PURPOSE

The purpose of the OceanaGold Waihi (OGW) Correnso/SUPA/MDDP Stability Annual Report is to comply with the requirements of the following Hauraki District Council (HDC) consent conditions:

- LUC RC-15774 (Trio) Condition 16 – Risk of Surface Instability;
- LUC 202.2012 (Correnso) Condition 25 – Surface Stability;
- LUC 202.2016 (SUPA) Condition 19 – Surface Stability;
- LUC 202.2017 (MDDP) Condition 25 – Surface Stability; and
- LUC 202.2018 (Project Martha) Condition 75 – Underground and Surface Stability

Please note that the anniversary for the Correnso report was originally 20 December, the date in 2013 when the first blast was initiated in the Correnso Consent Area. In agreement with HDC, this anniversary was revised to 31 December to coincide with other calendar year data collation and reporting. The agreed anniversary for the SUPA, MDDP and Project Martha stability reports was also agreed to be 31 December to allow the information from the linked projects to be amalgamated into one combined report.

Additionally, in agreement with HDC, the Trio Stability report has been incorporated into the combined annual stability report from 2021.

For ease of reporting and interpretation, work completed within the MDDP project area is reported within the Project Martha sections of this report.

1.1 AS REQUIRED BY CONDITION 16 OF LUC RC-15774 (TRIO)

16. *The consent holder shall provide to the Hauraki District Council on an annual basis (within one month of the agreed anniversary) a report:*
- a) *Describing the location, depth height of completed filled stopes, and unfilled stopes;*
 - b) *Describing the backfilling and compaction associate with each stope; and*
 - c) *Ground conditions revealed by the mine excavations*
 - d) *Describing the measures adopted to manage the risk of surface instability, particularly as provided for in Condition 15 and the outcomes of such measures.*

1.2 AS REQUIRED BY CONDITION 25 OF LUC 202.2012 (CORRENZO)

25. *The consent holder shall provide to the Council on an annual basis (within one month of the agreed anniversary) a report:*
- e) *Describing the location, depth height and volume (m³) of stopes; and a summary of the data required by Condition 26 regarding unfilled stope voids; and*
 - f) *Describing the lengths of development that, due to the encountered geotechnical conditions where multiple levels overlap, will require backfilling prior to mine closure; and*
 - g) *Describing the backfilling and compaction associated with each stope; and*
 - h) *Describing the ground conditions revealed by the mine excavations; and*
 - i) *Describing the monitoring and measures adopted to ensure ground surface stability, particularly as provided for in Condition 23 and the outcomes of such measures; and*
 - j) *Describing the location and depth of exploratory drives;*

- k) *Confirming that the extent of the mining works is confined to CEPPA, as defined in Figure 1.*

1.3 AS REQUIRED BY CONDITION 19 OF LUC 202.2016 (SUPA)

19. *The consent holder shall provide to the Council an annual report (within one month of the agreed anniversary established in condition 4 or as otherwise agreed in writing by the Council):*
- a) *Describing the location, depth height and volume (m³) of stopes; and a summary of the data required by Condition 20 regarding unfilled stope voids; and*
 - b) *Describing the lengths of development that, due to the encountered geotechnical conditions where multiple levels overlap, will require backfilling prior to mine closure; and*
 - c) *Describing the backfilling and compaction associated with each stope; and*
 - d) *Describing the ground conditions revealed by the mine excavations; and*
 - e) *Describing the monitoring and measures adopted to ensure ground surface stability, particularly as provided for in Condition 15 and the outcomes of such measures; and*
 - f) *Describing the location and depth of exploratory drives;*
 - g) *Confirming that the extent of the mining works is confined to SUPA, as defined in Figure 1.*

These reports may be prepared in conjunction with similar reports prepared in accordance with the consent conditions applying to the Correnso Underground Mine.

1.4 AS REQUIRED BY CONDITION 25 OF LUC 202.2017 (MDDP)

25. *The consent holder shall provide to the Council an annual report (within one month of the agreed anniversary established in condition 4 or as otherwise agreed in writing by the Council):*
- a) *Describing the location and depth of the exploratory drives and any intentional interceptions of historic development, rises and access drives; and*
 - b) *Describing the lengths of development that, due to the encountered geotechnical conditions or where multiple levels overlap, will require backfilling prior to MDDP closure; and*
 - c) *Describing the ground conditions revealed by the MDDP excavations using key identification criteria as defined by an independent geotechnical specialist and*
 - d) *Describing the monitoring and measures adopted to ensure ground surface stability, particularly as provided for in condition 21 and the outcomes of such measures; and*
 - e) *Confirming that the extent of the underground works is confined to the MDDP area as defined in Figure 1.*

Advice Note:

These reports may be prepared in conjunction with similar reports prepared in accordance with the consent conditions applying to the CEPPA and SUPA.

1.5 AS REQUIRED BY CONDITION 74 OF LUC 202.2018 (PROJECT MARTHA)

74. *The consent holder shall provide to the Council on an annual basis (within one month of an agreed anniversary date) a report:*
- a) *Describing the location, depth height and volume (m³) of stopes and a summary of the data required by Condition 75 regarding unfilled stope voids; and*

- b) Describing the lengths of the development that, due to the encountered geotechnical conditions or where multiple levels overlap, will require backfilling prior to mine closure; and
- c) Describing the backfilling associated with each stope; and
- d) Describing the ground conditions revealed by the mine excavations; and
- e) Describing the monitoring and measures adopted to ensure surface stability, particularly as provided for in Condition 71 and the outcomes of such measures; and
- f) Describing the location and depth of exploratory drives; and
- g) Confirming that the extent of the mining works is confined to the Project Martha area as defined in Plan A of Appendix 2.

2. LOCATION, DEPTH, HEIGHT AND VOLUME OF STOPES

(Consent conditions: Trio c.16a, Correnso c.25a, SUPA c.19a, Project Martha c.74a)

Trio

No stoping in the Trio project area was undertaken during 2021.

Correnso/SUPA

Stoping activities during 2021 were concentrated around the upper parts of Correnso, the central and lower parts having been mined out.

The main stoping methodology is Modified Avoca (refer to Appendix A for a graphical representation). This method requires a 'bottom-up' mining technique, whereby each successively higher stope is mined out by driving on the surface of the previously laid backfill of underlying stopes. This technique also requires development firstly to the extremities of the ore body, then mining back towards the access points. An Overhand Cut and Fill method was also utilised in some narrow upper areas of Correnso during 2021.

A view of Correnso mining operations for the period is presented in Figure 3.

No mining activities occurred in Louis mining area during 2021.

Stope extraction began in mid-2015, with production continuing through 2021. At any time, multiple stopes are in various states of the production cycle (drilling, blasted stocks, bogging, and backfilling). This means that some stopes may have open voids at the end of the month. By the end of the reporting period, a cumulative 592,009 m³ of stope volume had been extracted, with 591,543 m³ backfilled (Figure 1). The upper level of mining remained at the 965 level on the Daybreak Vein. The upper level of Correnso was increased from the 942 level to the 954 level during 2021 to facilitate access to Correnso Upper. The depth of the Correnso area remained unchanged during 2021 at 705 mRL.

The stope width during 2021 was narrowed compared to previous years with the primary mining being from narrow vein techniques, with stope widths around 2 m wide. The vertical height was typically 8 m, driven by stope width and vibration constraints.

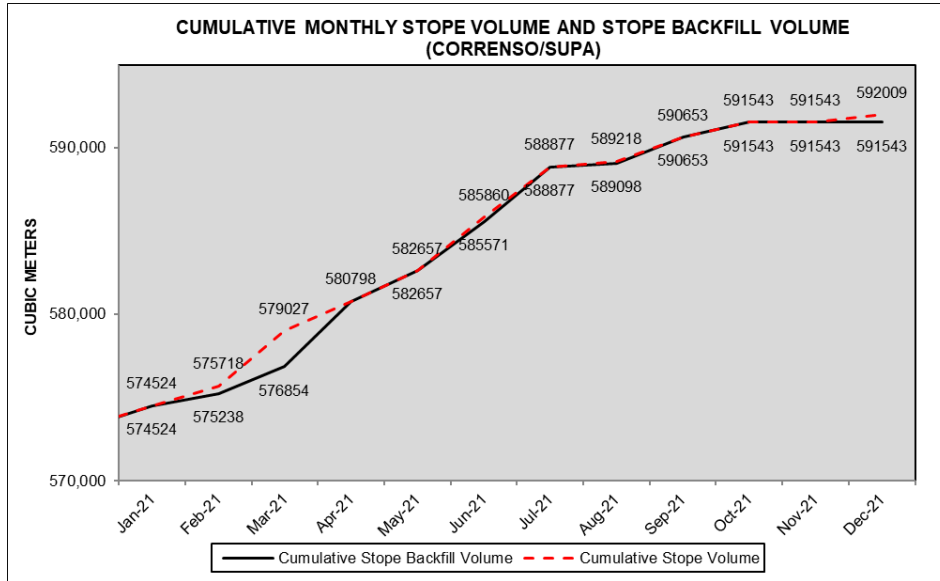


Figure 1: Correnso cumulative monthly stope voids and backfill volumes 2021

Project Martha

Small scale stoping using the Modified Avoca method commenced in the Project Martha area in 2021 in the mining areas of Rex, Empire, Royal West and Edward. Stopes were mined at various levels through these mining areas ranging from 750 mRL to 937 mRL. The cumulative stope volume extracted for the period was 28,250 m³, with 26,582 m³ of backfill placed (Figure 2).

Stope heights are typically 18 m (floor to floor) in all areas except for Rex which was reduced to 15 m due to vibration constraints. Stoping widths varied from 2 m to 4 m depending on the vein width. The vertical extents of development at the end of 2021 was approximately 275 m spanning from 710 mRL to 985 mRL. A view of Project Martha mining operations undertaken to date is included as Figure 4.

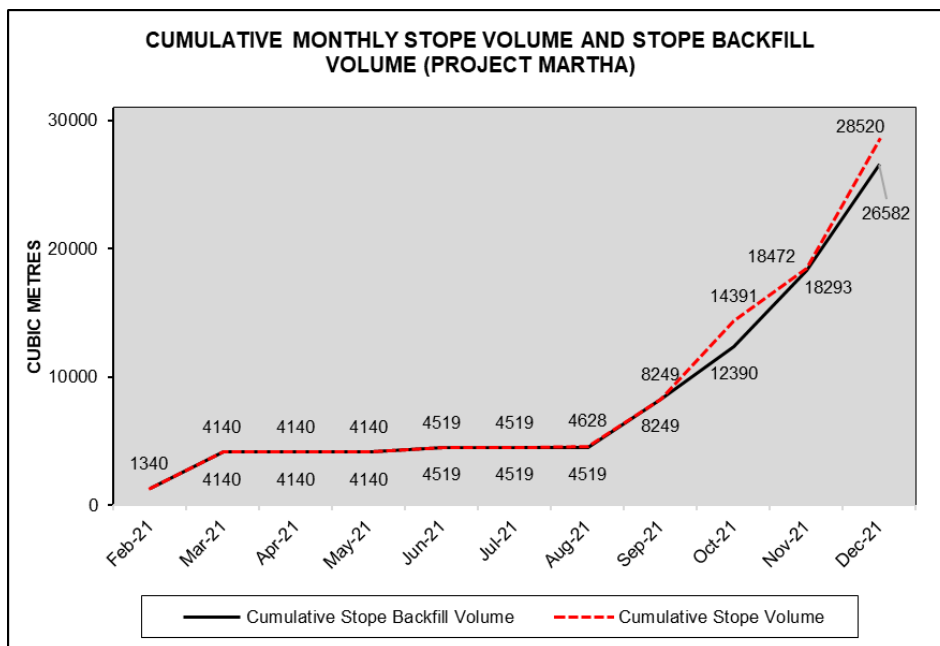


Figure 2: Project Martha cumulative monthly stope voids and backfill volumes 2021

3. DEVELOPMENT & EXPLORATION DRIVES

(Consent conditions: Correnso c.25b&f, SUPA c.19b&f, MDDP c.25a, Project Martha c.74f)

Areas of the mine in which development occurred during 2021 are:

- Correnso Upper (all air-leg drives);
- Development drives in the Martha Project Area.

Figures 5 to 7 indicate development progress across the operations as at 31 December 2021.

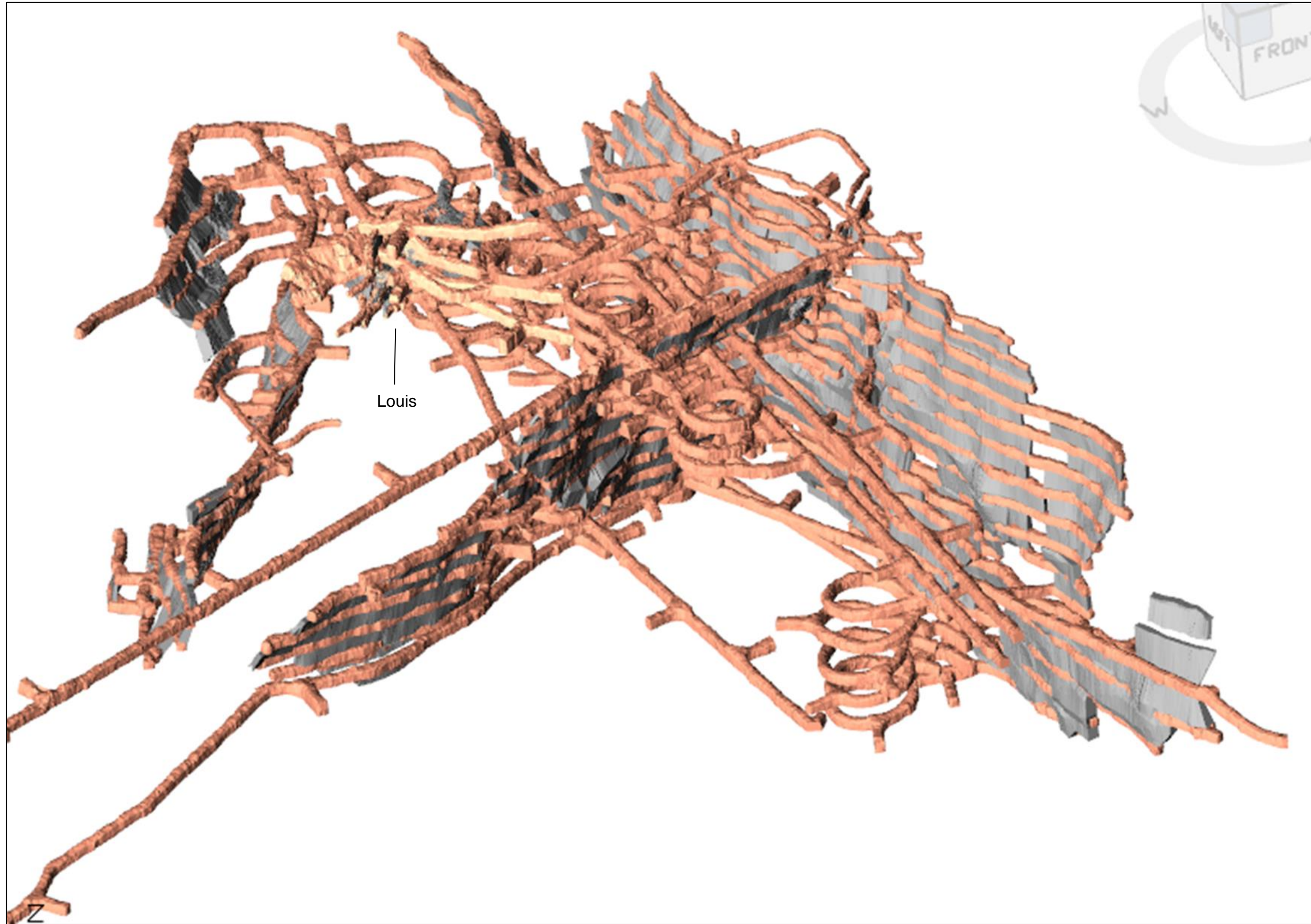


Figure 3: Oblique view of Correnso showing completed development (orange) and stoping (grey) activities. View is looking north east from above.

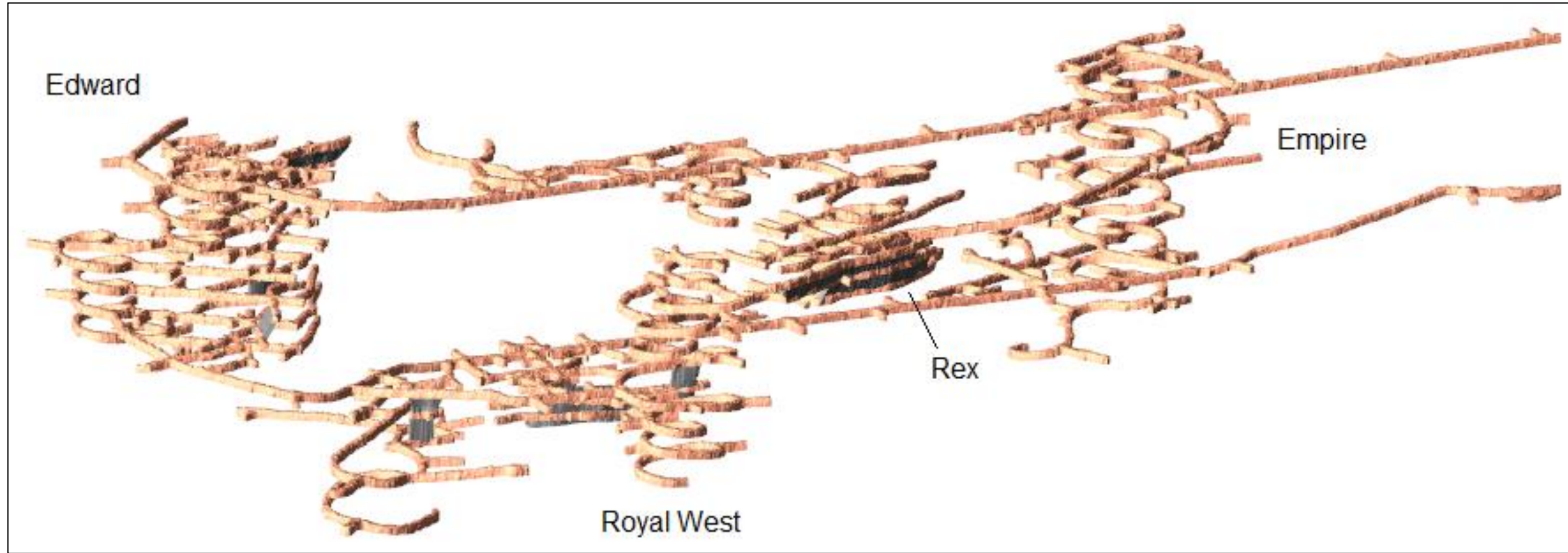


Figure 4: Oblique view of Project Martha showing completed development (orange) and stopping (grey) activities. View looking north east.

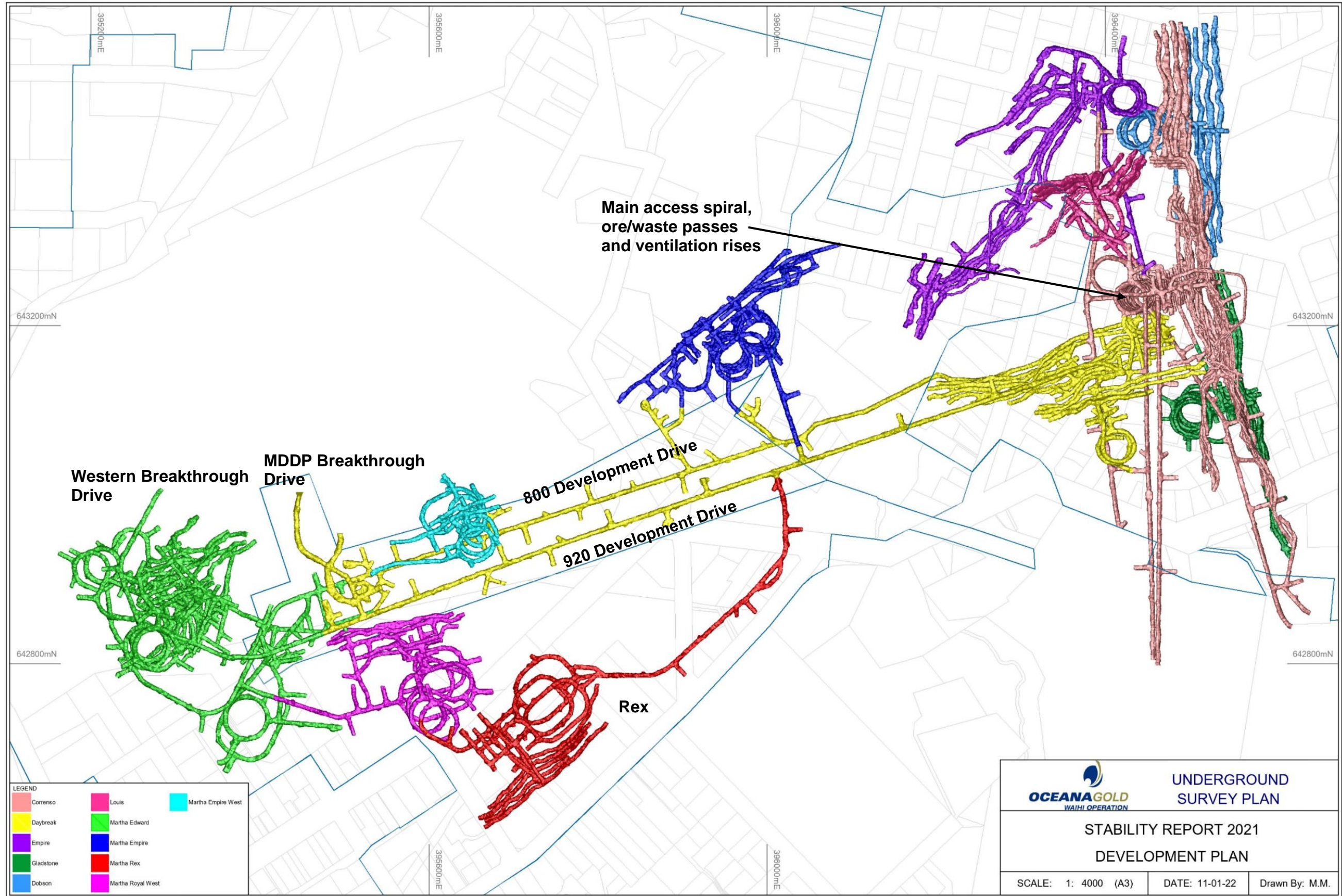


Figure 5: Development – Plan View (overlying property boundaries)

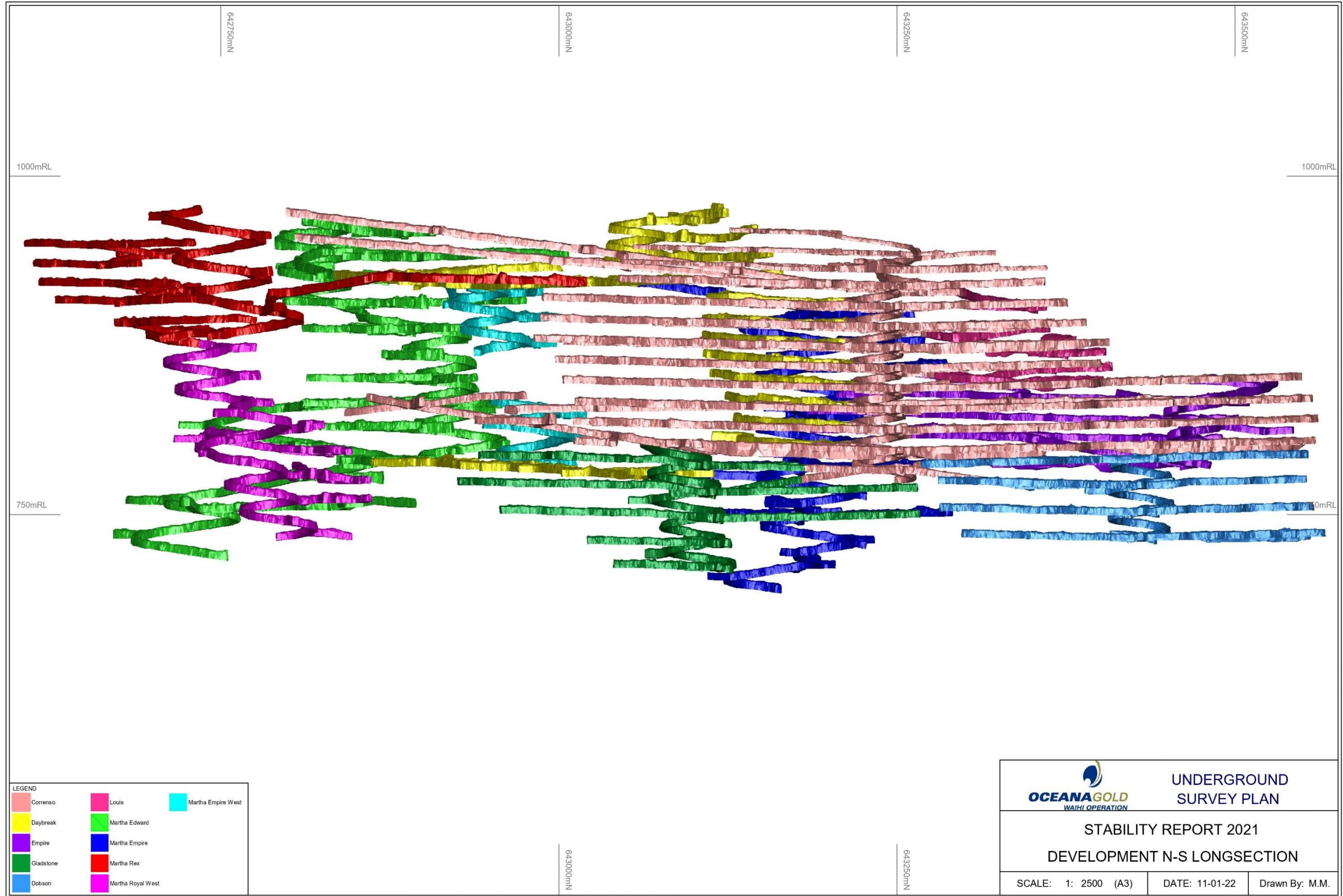


Figure 6: Development – Long Section View (left to right: south to north)

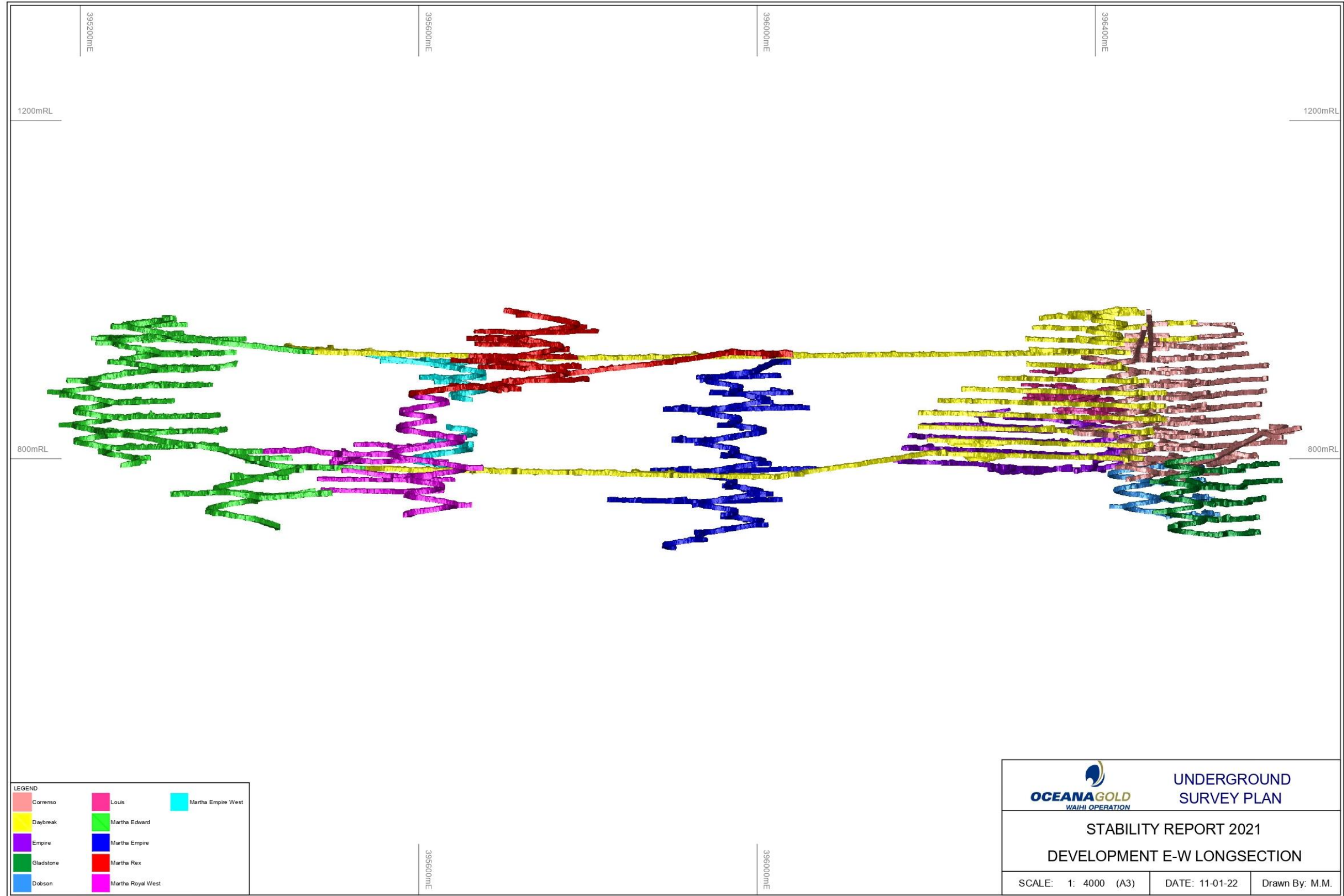


Figure 7: Development – Long Section View (left to right: east to west)

4. BACKFILLING AND COMPACTION

(Consent conditions: Trio c.16b, Correnso c.25c, SUPA c.19c, MDDP c.25b, Project Martha c.74c)

All stopes extracted to date are backfilled as is dictated by the mining method and conditions. Compaction occurs during backfilling by the machine placing the fill in the stope, then continues with subsequent operations of heavy machinery on top of the backfill. Historically this gives good compaction and the high clay-content of the fill provides a good binding medium.

Some areas in the Martha Project Area have been backfilled with consolidated fill (CRF) where required by the mining schedule.

Historical voids, where identified, have been backfilled. 4,486 m³ of backfill was placed into historic voids during the reporting period.

Extensions of drives beyond stoped areas were also backfilled.

5. GROUND CONDITION REVEALED BY EXCAVATIONS

(Consent conditions: Trio c.16c, Correnso c.25d, SUPA c.19d, MDDP c.25c, Project Martha c.74d; Consent conditions: Correnso c.25b, SUPA c.19b, MDDP c.25b, Project Martha c.74b)

Ground conditions encountered were mostly as expected. A summary of ground conditions for the separate mining areas are provided below. The capitalised descriptors Very Poor, Poor, Fair, Good, Very Good are the NGI (Barton, 1974) Q-value rock mass classifications based on a combination of the blockiness of the rock mass, the frictional properties of the joints and the stress environment.

Trio

Ground conditions encountered in the Trio project area have been covered in previous editions of the Trio Stability Reports. No new conditions have been encountered during this reporting period.

Correnso/SUPA

The upper levels of Correnso, above 915 level, are in Good to Very Good ground conditions. Development has been mostly using air-leg equipment and the drives are of significantly smaller dimensions than below 915.

Development has been carried out on southern extensions of Correnso on the 815 and 840 levels. Ground conditions were mostly Good to Very Good. There were no areas of significantly poorer ground.

Louis is a relatively shallow-dipping vein(s) trending northeast towards Correnso North, dipping southwest. Host rock conditions are generally Good.

Project Martha

The 800 & 920 Edward Incline and Declines continued to be developed during 2021 and achieved breakthrough connection in Q4, 2021. In general, ground conditions are Fair to Good with local regions characterised by moderate to highly weathered zones generally associated with geological structures such as the Welcome series of structures. Fibrecreting and upgraded support was carried out locally through more intensely oxidised and weathered zones as a profile control measure along with corrosion-prevention but in most part no secondary support has been required.

The upper and mid Edward Access and Ore drive development encountered significantly poorer ground conditions. The rock mass is strongly jointed and oxidised with the most intense oxidation

associated with numerous vein structures and late-stage jointing. Local exsolution cavities occur within the zones of veining and discontinuous shear zones are not uncommon in the sections of poorer ground. Secondary support (shotcrete / in-cycle fibrecrete and cable bolts) has been utilised as additional reinforcement during development. Rock mass classification ranges locally from Very Poor to not much better than Fair.

The rock mass conditions in Edward closer to the Open Pit (South) wall is characterised by increased joint weathering and a more dilated rock mass although the oxidation is still strongly associated with veining.

Capital development in the Empire mine areas saw the breakthrough connection between 800 incline and 920 decline in Q1 2021. Access and ore drive development for the Empire mine area has been consistently in favourable rock mass conditions characterised by Good to Very Good ground conditions. No secondary support has been required beyond standard installation practices in general development. Some local support upgrades have been required in the Empire West in relation to local wedge forming discontinuities in relation to drive geometries or where orebody associated structures and shears have been present. Rock mass conditions appear increasingly oxidised closer to the Open Pit (south) wall, although the oxidation is still strongly associated with veining and geological structures.

Capital development in the Rex & Royal West areas saw decline breakthrough connection in Q4 2020. Early development of the Rex Access intersected sheared zones with Q-value classifications Very Poor to Extremely Poor through the most intensely sheared sections, requiring in-cycle fibrecrete and cable bolting. In general, ore drive development in host rock see largely Fair to Good ground conditions. Associated vein and ore body structures in the Rex have been characterised by 'sugary' quartzose Very Poor to Poor rock mass condition where local support upgrades have been required in the form of fibrecrete and deeper embedment split set support. Level access and ore drive development in the Royal West mining areas has generally encountered Fair to Very Good rock mass conditions and only localised support upgrades have been required due to mining geometries in relation to wedge forming discontinuities or where localised zones of poor ground have been encountered generally associated with weathered or sheared geological structures.

Where ground conditions have been encountered that pose vulnerability to long term geotechnical instability, or where multiple levels overlap, development areas have been tight backfilled as a precautionary measure prior to level closure.

6. MONITORING AND MEASURES FOR STABILITY

(Consent conditions: Trio c.16d, Correnso c.25e, SUPA c.19e, MDDP c.25d, Project Martha c.74e)

The previously installed seismic monitoring system (as per consent conditions: Correnso c.23d, SUPA c.15d, & MDDP c.21c) was upgraded and expanded in 2021 to cover and capture wider field monitoring that covers the MUG mining areas. The system is designed to provide additional reassurance that mining activity is not inducing notifiable seismic events in response to mining.

The seismic system also stands to help monitor regional stability and the rock mass response to mining activities in the critical areas. Given the shallow depth of stoping and a relatively benign stress regime, the seismic system is not expected to record many non-blasting related seismic events. The maximum horizontal stresses pre-mining at 300m depth are measured at 22 MPa; with maximum vertical stresses (due to depth of the overlying rock) are around 15 MPa. These stresses are well below the 60 to 120 MPa average range of measured strengths of the rock mass that hosts the orebodies in the region.

It is generally accepted in industry that event magnitudes of:

Magnitude	Potential impact
$mL \leq 0.0$	does not impact on operations
$0.0 < mL \leq 0.5$	could potentially impact on operations, but typically marginally.
$0.5 < mL \leq 1.0$	prudent to utilise dynamic ground support systems
$1.0 < mL \leq 2.0$	could require special energy absorbent support systems
$mL > 2$	requires specifically designed dynamic ground support systems.

The agreed critical magnitude for Correnso and Martha is a conservative $ML = -0.5$. Any seismic event of $ML = -0.5$ and above are thus defined as an "anomalous result", and must be reported to the HDC monthly and the following details are required:

- Event magnitude and location coordinates;
- Image plot of the seismic events that includes existing openings and significant geological structures; and
- Explanation of the probable cause of the seismic events.

There were no reportable seismic events in 2021.

Plans for further rock mass monitoring are planned for early 2022 including MPBX extensometers, slough meters, smart cables and clock-its. Monitoring will target crown pillar areas, where mining activity and development is near historic voids and where pillar close out for production extraction continues in all mining areas of Martha Underground.

The installation of 3 deep borehole multi point wire extensometers were installed above the Rex mining area from surface in Q2 2021. The purpose of these instruments is to monitor any deformation or settlement of the crown pillar above the Rex mining area to the surface in response to mining activity. This is largely due to the Rex's relatively shallow depth and proximity to Waihi township. These live real-time instruments show very minor deformation or change since their installation and production activities commencing in Rex, with less than 2 mm of movement being recorded at 90 m depth over the last 6 months.

7. MINING CONFINED TO CONSENT BOUNDARIES

(Consent conditions: Correnso c.25g, SUPA c.19g, MDDP c.25e, Project Martha c.74g)

Figure 8 displays the current mine development overlying an aerial projection, with the consent boundaries superimposed. All current works are entirely within the consent boundaries.

Surveying methodology has been previously audited and found to be well within the standards prescribed. This accuracy has been utilised to ensure that works stay conservatively within consent boundaries.

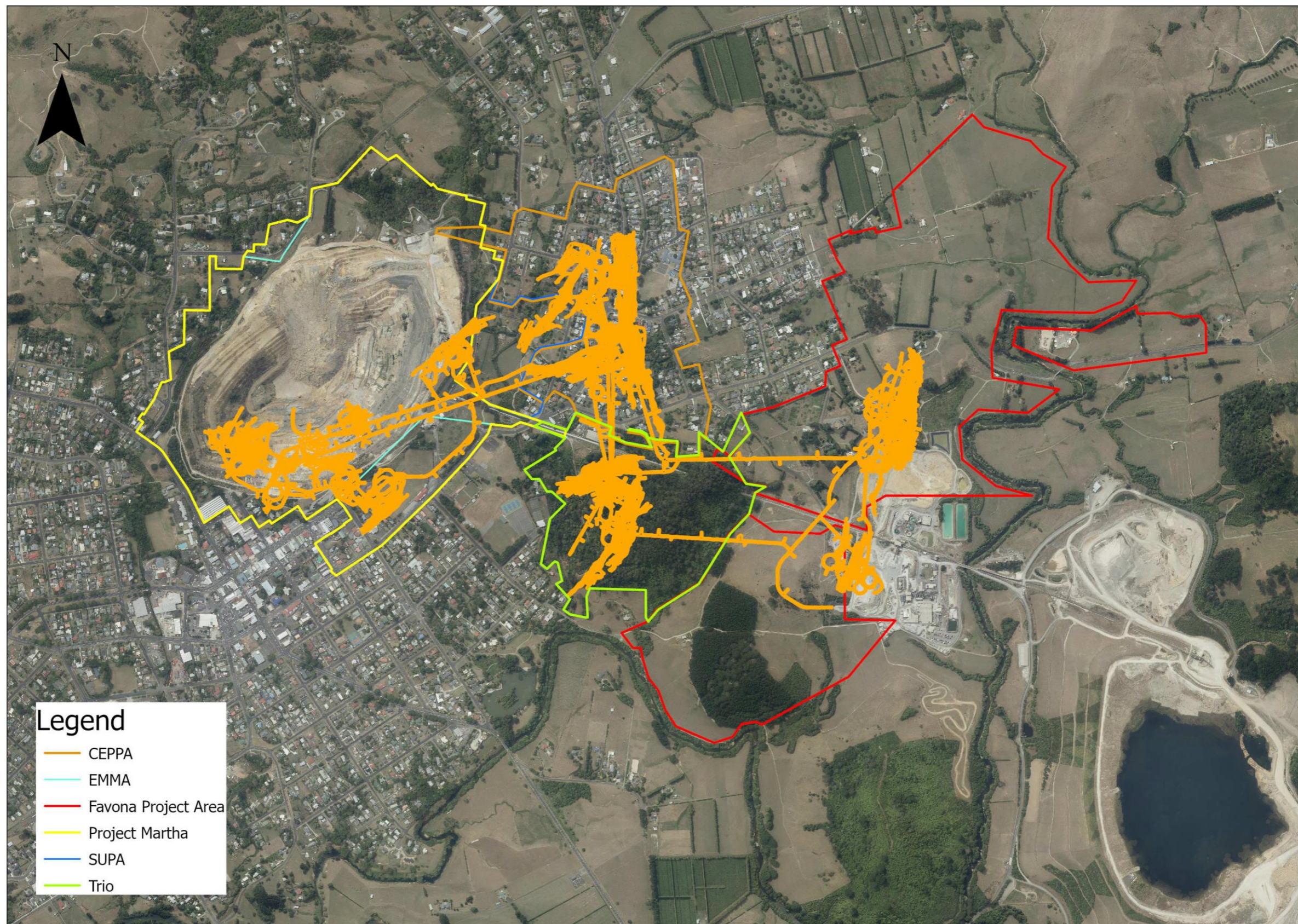


Figure 8: Development – Plan View (with Trio, CEPPA, SUPA, MDDP and Project Martha boundaries)

8. REVIEW OF CONSENT CONDITION REQUIREMENTS

- a) Mining methods used require stope voids to be backfilled
All stopes are backfilled as is required for the Avoca mining method (pictorial representation in Appendix A). The limited areas of Cut and Fill mining have also been backfilled.
- b) Limits to upper levels of stoping
The uppermost level on which stoping has been carried out by the end of 2021 was the 965 Daybreak (950 – 965).
- c) Development backfilling where required by geotechnical conditions
Refer Section 4 and 5. Unless ground conditions were encountered that create geotechnical instability, or where multiple levels overlap, no areas of development having ground conditions described in section 5 are expected to require backfilling.
- d) Seismic monitoring and rock movement monitoring
Refer Section 6 above for monitoring systems.
- e) Grouting of surface-drilled holes
All surface-drilled exploration holes have been grouted during the reporting period.
- f) Interception of surface-drilled holes with water flows, and their treatment
There were no surface drillholes intercepted during 2021 (refer Appendix B).
- g) Works confined within consent boundaries
Refer Figure 8 for work locations.
- h) Historical open voids formed from caving or stoping shall be identified to be backfilled
Refer Section 4.
- i) No stoping in the Rex Orebody shall occur above a depth of at least 40m below the top of the andesite
No stoping has occurred above this level.
- j) Backfilling of any other underground workings that overlap with the Martha Underground Mine where geotechnical conditions require backfilling to ensure long-term stability
Refer Sections 4 and 5.
- k) Three extensometers to be installed from the surface above the Rex Orebody where practicable
Refer Section 6.

9. CONCLUSION

OceanaGold believes it has fully complied with Conditions 16 (of HDC LUC RC-15774), 25 (of HDC LUC 202.2012), 19 (of HDC LUC 202.2016), 25 (of HDC LUC 202.2017) and 74 (of Project Martha HDC LUC 202.2018) and that the risk of ground surface instability is extremely low due to the geology of the area and best practice underground mining methodologies which have been employed.

Please note also that the 6 monthly tilt surveys have continued to show there is no evidence of mining induced surface instability.

10. REFERENCES

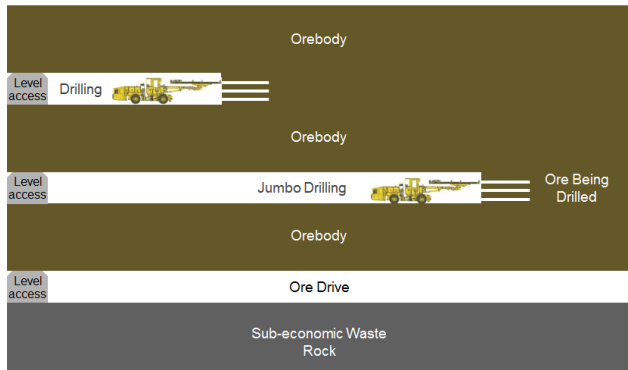
Barton et al (1974). Barton, N., Lien, R. and Lunde, J. 1974. Engineering classification of rock masses for the design of tunnel support. *Rock Mech.*, May. 189-236.

Appendix A

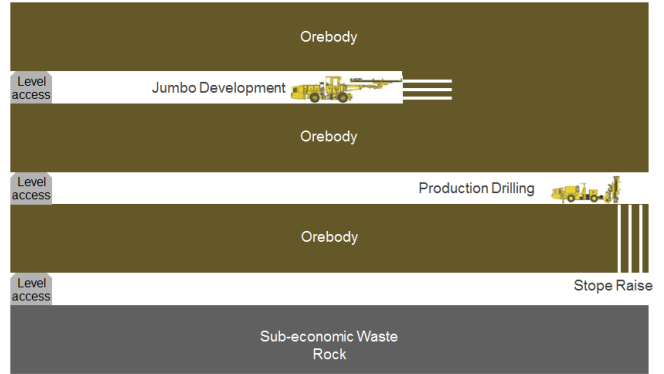
Modified Avoca Technique

Schematic of Modified Avoca Technique

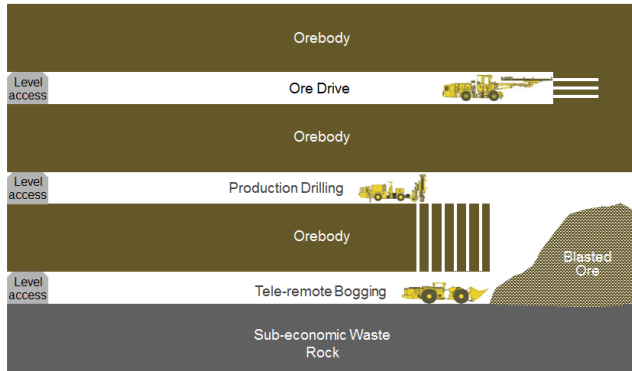
1 Drill drive access



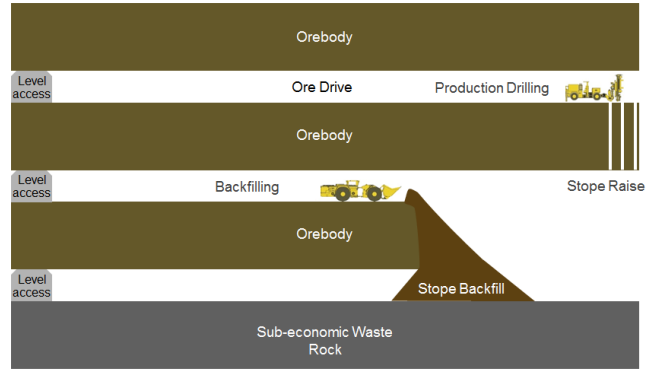
2 Production drilling



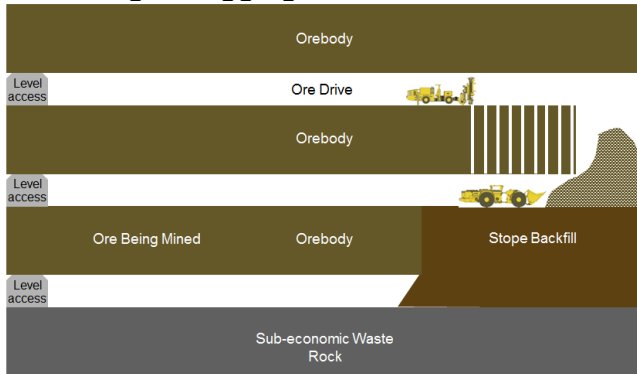
3 Production blasting & bogging



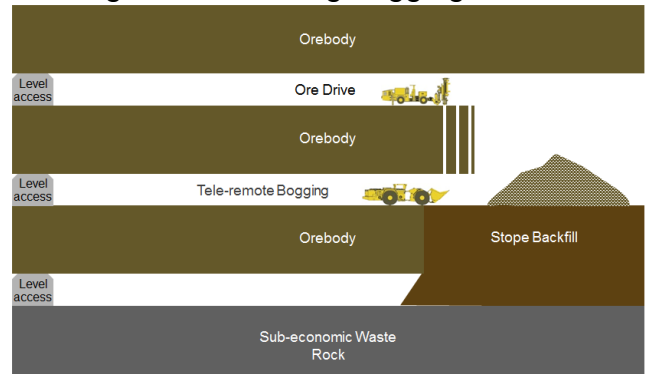
4 Backfilling



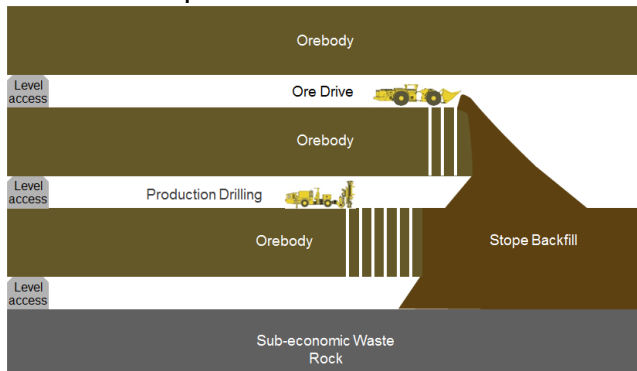
5 Blasting & bogging over backfill



6 Progressive blasting/bogging



7 Multi-level production/backfill



Appendix B

Surface Drillholes Intersecting Workings

Hole ID	Level	Drive	E	N	m.R.L	Date intersected	Pickup	Grouting status	Comments
CGD008	810	C4-FW	396488.5	643473.4	821.4	13/06/2015	Estimated	Not grouted	Hole dry - no evidence of being a water conduit at this level: no Fe staining
UW320	912	ACC	396431.997	643265.11	917.774	13/04/2015	Surveyed	Not grouted	Hole dry
UW348	900	C1-N	396520.5	643263.45	907.62	14/12/2015	Estimated	Grouted	Trickling water which ceased within a day - grouted 16/12/2015
UW358A	900	C1-S	396586.70	643035.20	910.55	25/07/2016	Estimated	Grouted	Low flow, originally grouted within 12 hours, re-grouted after 36 hours. Surrounding split sets grouted as were acting as a conduit. Flow was approximately 1ltr/min
UW365	810	C4-FW	396488.40	643474.8	821.4	9/06/2015	Estimated	Not grouted	Hole dry
UW368	825	C7-S	396515.30	643114.23	833.067	26/08/2015	Surveyed	Grouted	Minor flow - hole re-grouted 16/12/2015
UW386	915	ORE PASS	396482.30	643218.53	914.937	4/02/2015	Surveyed	Not grouted	Hole dry - now in ore pass
UW390	840	C1-S	396541.39	643198.97	844.082	25/03/2015	Surveyed	Not grouted	Hole dry - no evidence of being a water conduit at this level: no Fe staining
UW393	840	C4-HW	396472.92	643416.31	851.398	16/08/2015	Estimated	Not grouted	Hole dry
UW402	953	CDD	396449.30	643126.90	930.5	17/12/2014	Surveyed	Grouted	Hole was producing minimal water for only a few hours
UW402	855	C7-S	396515.03	643092.42	864.645	18/10/2015	Surveyed	Not grouted	Dry - second time intersecting hole with development - was grouted on the 953

UW374	860	DB-HWW	396237.72	643120.73	871.896	16/12/2016	Surveyed	Not grouted	Hole was dry, no indication of previous water - i.e. no Fe staining, etc.
CGD003	942	ACC	396486.76	643260.62	941.1	12/03/2017	Estimated	Not grouted	Only a very light trickle and ceased completely within 24 hours
UW339	~775	Dobson RAD	396489.45	643296.31	778.239	10/06/2017	Surveyed	Not grouted	Hole intercept in backs dry but producing water from the floor due to being below the current water table. Floor intercept plugged 26/6/17 but no need to plug the backs intercept.
UW748	Historic 7	Top west corner of stope panel on Cobra Blk on Royal	395582.39	642600.71	1113.500	17/09/2021	Surveyed	Grouted	Historic stope intersected intentionally. Hole lost drilling water pressure at void.

Below is a plan view section showing development on Correnso, Daybreak and Empire mine areas. Surface drillholes which intersect development, along with their pierce points, are shown; green points indicate the drillhole collars in the view while the red points indicate the approximate intersection point of surface drillholes with development.

